CERN neutrino project on target

August 16 2005

Scientists at CERN announced the completion of the target assembly for the CERN neutrinos to Gran Sasso project, CNGS. On schedule for start-up in May 2006, CNGS will send a beam of neutrinos through the Earth to the Gran Sasso laboratory 730km away in Italy in a bid to unravel the mysteries of nature's most elusive particles.

CNGS forms a unique element in the global effort to understand neutrinos, the chameleons of the fundamental particle world. Neutrinos come in three types, or flavours, and have the ability to change between one flavour and another. Neutrinos interact hardly at all with other matter. Trillions of them pass through us every second, and it is precisely their vast numbers that make them a key element in understanding the Universe and its evolution.

The neutrinos leaving CERN are mainly of the muon type. Theory says that by the time they get to Gran Sasso, some of them will have changed into tau neutrinos. Detectors under construction at the Gran Sasso laboratory will measure how many tau neutrinos appear. This is the crucial distinction between CNGS and other long baseline neutrino experiments, which measure the numbers of muon neutrinos at the source and at the detectors to count how many disappear on the way. The measurements are complementary, and both are necessary for a full understanding of the physics of neutrinos. CNGS's neutrino experiments must be extraordinarily sensitive to detect the small number of tau neutrinos appearing in the beam. Just a few a year will be detected at Gran Sasso.

Having been successfully assembled in the lab, the CNGS target will now be dismantled for installation in its underground target chamber. Installation of the neutrino beam will be complete by the end of the year, and the first beam of neutrinos will leave Geneva, pass about 10km below Florence, and reach Gran Sasso northeast of Rome in May 2006.

Citation: CERN neutrino project on target (2005, August 16) retrieved 20 March 2024 from https://phys.org/news/2005-08-cern-neutrino.html

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